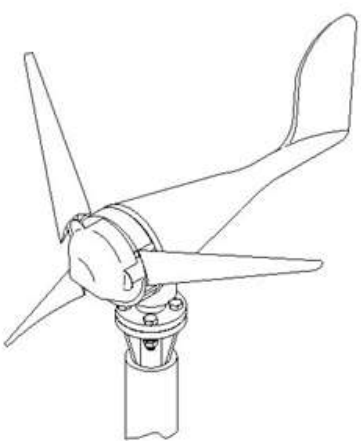
Wind Turbine Installation Manual



Please read this manual carefully before use

This manual covers the following product codes: BWT100S, BWT400S and BWT500M

INTRODUCTION

Thank you for purchasing a Biard wind turbine kit.

- This Installation manual contains all safety and installation instructions for the Biard wind turbine models BWT300S, BWT400S and BWT500M only, Biard assumes no responsibility for inaccuracies or omissions. Biard reserves the right to make changes to the product specification, or its manual without prior notice.

- Like other sources of electrical power, Biard wind turbines must be installed following the regulations outlined by the government. Consult a local electrician or local planning offices for detailed information about your area.

- All products within these kits are manufactured to the highest standard. Please use in accordance with these instructions to ensure optimum performance and safety.

Warning! Before installing or using the wind turbine please ensure that these instructions have been carefully read with particular attention to all safety instructions, warnings and cautions. The product/s must be used correctly at all times for the purpose in which it is intended. Any damage and/or personal injury resulting from failure to comply with these instructions will invalidate the warranty. Please keep these instructions in a safe place for future use.

PRODUCT DESCRIPTION

The Biard wind turbine Kits are designed by a team of electricians in the UK to the highest of industry standards. All components are CE and RoHS approved.

Biard wind turbines are designed to try and take the complication out of installing and using wind to generate your own source of power. Biard wind turbines benefit from low start up speeds, low vibration, ease of installation and are aesthetically pleasing.
All biard wind turbines have precise injection moulded blades for strength and aerodynamic qualities which contribute to the annual yield from the turbine.
The wind turbine itself is an ultra-reliable three phase permanent magnet synchronous generator which efficiently manages resistance and torque to give the best annual yield.

APPLICATIONS

- Caravan
- Boats
- Home or Small Business
- Allotment
- Remote Buildings
- Shed
- Garage

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SAFETY INFORMATION

These Biard wind turbine kits are not intended for use by children. Additionally, any person with reduced sensory, physical or mental capabilities, or lack of experience and knowledge, must be instructed on how to use or install the kit by a person qualified to do so.

- The tips of the blades can become almost invisible when turning at speed and can cause serious injury.
- Although the voltages supplied by these turbines is relatively low dangers from electrical current still exists, therefore caution should be used when installing these products.
- Never have the battery(s) connected during installation; battery(s) can deliver high amounts of current.
- Do not attempt to install on excessively windy or wet days
- When assembling this product only use the products supplied
- Always use torque setting specified in table 1
- Once installation of the turbine is complete, the battery(s) should always be connected to the controller first before connection of the turbine
- Never install the turbine where anybody can approach the path of the blades
- Before assembly of the turbine is started please connect the three wires from the turbine together to apply the brake and be sure the blades will not turn during installation

PACKAGE CONTENTS

- Wind Turbine Body
- Assembly Parts as in Table 1
- Wind Charge Controller

TURBINE PRODUCT LIST

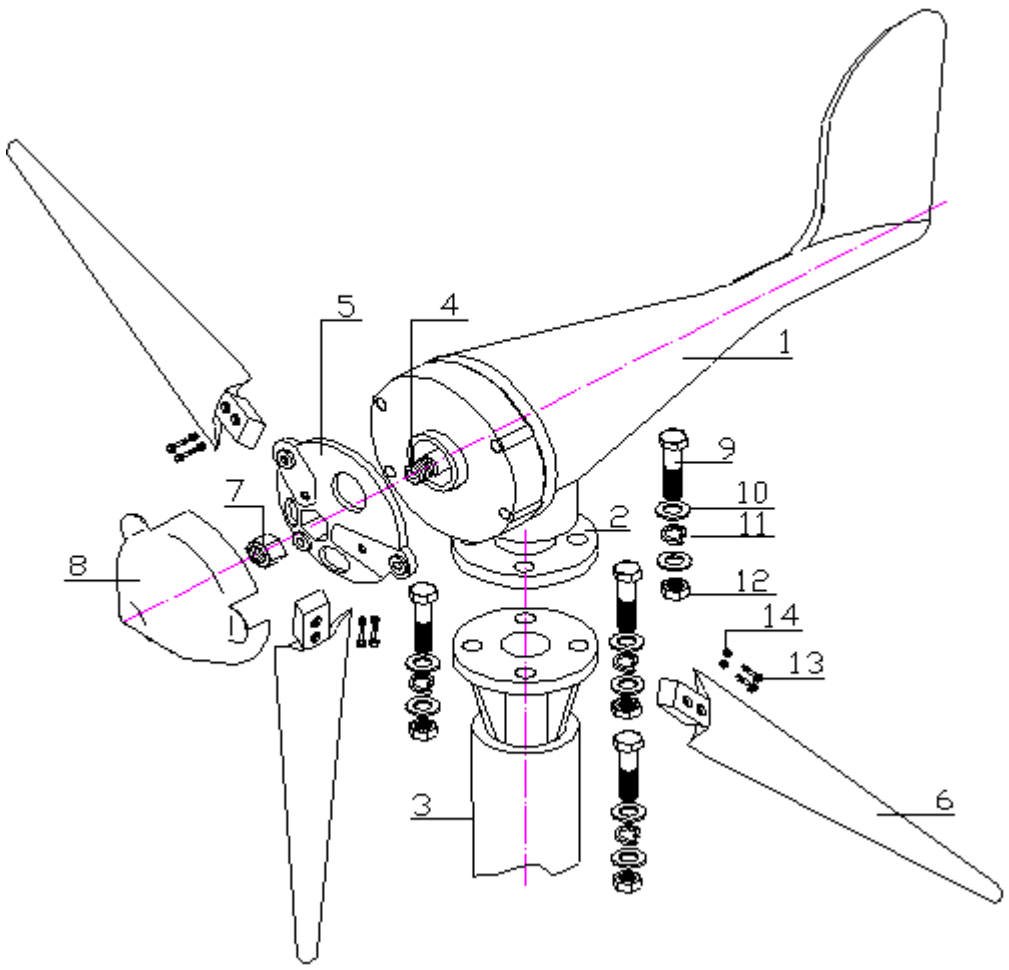
Table 1

Serial Number	Item	Quantity	Remarks
1	Wind Generator	1	100W, 300W or 500W
2	Hub	1	
3	Blades	3	
4	Lock Nut on Shaft (M16)	1	Torque to ≥68
5	Bolt for Blades (M6*40)	6	
6	Lock Nut for Blades (M6)	6	Torque to ≥13.6
7	Flange Bolt (M12*55)	4	
8	Nut (M12)	4	Torque to ≥58
9	Flat Washer	8	

TURBINE SPECIFICATIONS

Product Code	BWT100S	BWT400S	BWT500M
Rated Power	100	400	500
Maximum Power	130	410	510
Rated Voltage	12	12	12
Start Up Wind Speed	2.0	2.0	2.0
Rated Win Speed	10	13	13
Working Speed	2.5~25	2.5~25	2.5~25
Survival Wind Speed	45	35	30
Net Weight	6.0	6.8	9.8
Wind Wheel Diameter	1.2	1.4	1.6
Number Of Blades	3	3	3
Blade Material	Nylon Fibre		
Generator	Three Phase Permanent Magnet Synchronous Generator		
Controller System	Electromagnetic / Yaw		
Speed Way	Automatic Adjustment Of Wind Direction		
Working Temperature	-40 ~ 80		
Tower Type	Guyed Tower		

TURBINE ASSEMBLY



Decomposition of the Turbine

Please Note: The Biard wind turbine is sent to you partially assembled. Please take time to carefully read all the assembly instructions before attempting to assemble any of the components in or sent with this kit.

1. Turbine Body
2. Flange Base
3. Steel Tower
4. Axis Turbine Shaft
5. Hub
6. Blades
7. Locking Nut
8. Hub Cover
9. Bolt for Fastening Turbine to the Tower
10. Flat Washer
11. Rubber Washer
12. Locking Nut
13. Stainless Steel Screw
14. Locking Nut

TURBINE ASSEMBLY CONT.

1. Align the 2 holes in the blade (6) with 2 holes in the groove of hub (5), align accurately, then secure with stainless steel bolt (13) and locking nut (14) (Attention: locking nuts can only be used once, make sure the locking nuts are fastened tightly), for installation of the other two blades please repeat the same process, please refer to table 1 for torque settings of the nuts.

2. Place the wider end of lock nut (7) into hexagonal hole in the centre of the hub, then onto the threaded shaft of the turbine, hold the nut with one hand while rotate wheel clockwise with the other to thread the nut on to the shaft of the turbine, once hand tight use the hex wrench to fully lock the nut (Attention: do not try to take the nut of once on as this will damage the nylon thread of the locking nut) please refer to table 1 for torque setting of the nut.

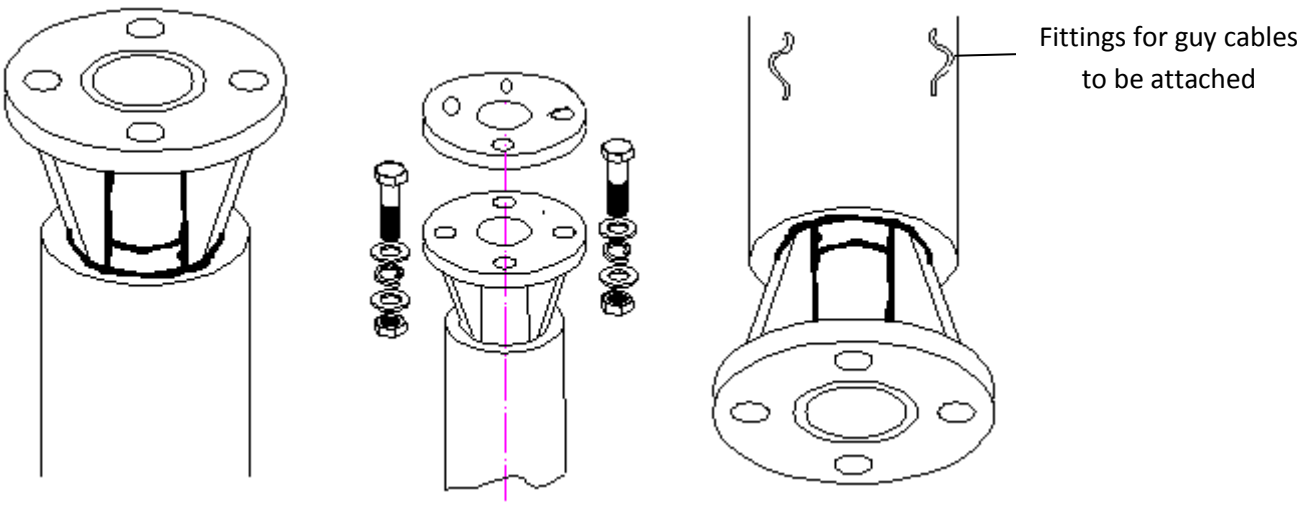
3. Place the wheel hub (8) over the front of the turbine and align the three notches in the hub over the blades of the turbine

TOWER ASSEMBLY

The tower can be purchased in three or six meters, if the six meter cable tower is purchased then you will receive two three meter lengths

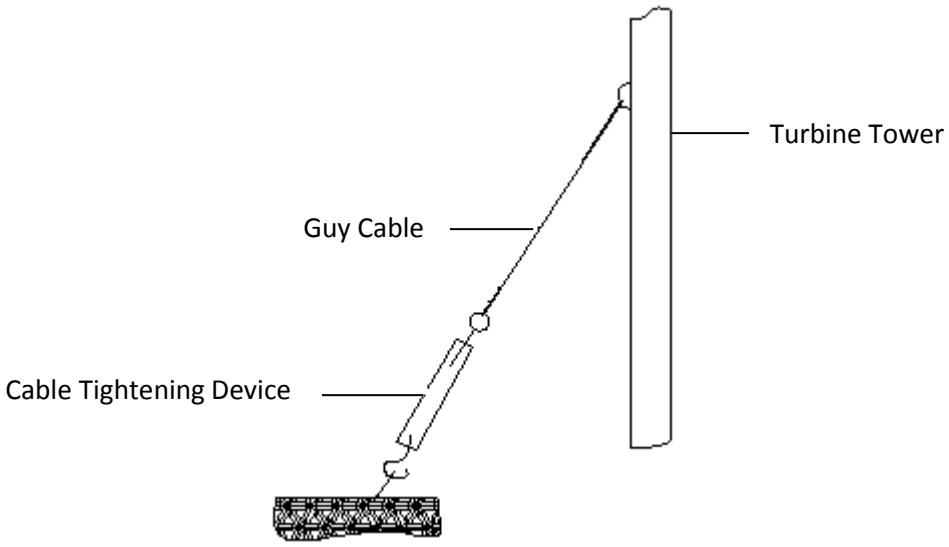
The two three meter towers are fixed together via the flange at the top of the first three meter and the flange at the bottom of the second three meter of the tower as in Fig 1

Fig 1



The four guy cables will be fitted to the hooks welded to tower as in Fig 2

Fig 2



FIXING THE TURBINE TO THE TOWER

Please Note: The cables to the turbine need to be connected and fed down the tower before the turbine is fitted to the tower, please ensure the three cables from the turbine are re-connected together to stop the blades from turning.

1. Align the wind turbine flange base (2) to the tower flange (3).
2. Place the washer (10) onto the bolt (9) and place through the flange of the turbine and the flange of the tower
3. Place the flat washer (10) and the spring washer (11) onto the bolt and fasten with locking nut (12).
4. For other three fixings please repeat above process

FIXING THE TOWER

1. Make sure the steel mounting bracket is placed on solid (concrete) level ground
2. Fasten the mounting bracket down using masonry anchor (raw) bolts, M12*80 (not provided)
3. Place the tower onto the mounting bracket and fasten with bolt and locking nut
4. Take care not to trap the cables from the turbine

INSTALLING THE GROUND ANCHORS (Not Supplied)

The type of ground anchor needed will depend on the type of ground the turbine will be situated on, there are for common types of ground anchor.

- Duckbill Anchor (hand driven into the ground)
- Auger Type (screw in)
- Expansion Bolt (raw bolt)
- L Shaped Concrete Anchors

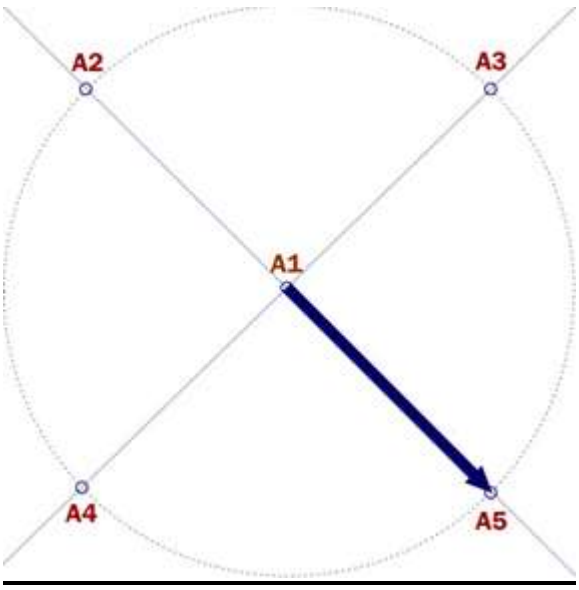
See below table for suggested ground anchor

Soil Type	Fixing Method	Fixing
Sand	Buried Concrete	L Shaped Ground Anchor
Loose Gravel	Buried Concrete	L Shaped Ground Anchor
Loam	None	Auger / Duckbill Ground Anchor
Clay	None	Auger / Duckbill Ground Anchor
Rocky Soil	None	Auger / Duckbill Ground Anchor
Gravely Soil	Buried Concrete	L shaped / Auger / Duckbill Ground Anchor
Solid (Soft) Rock	None	Large, Long Expansion Bolt
Solid (Hard) Rock	None	Smaller Expansion Bolt

Note:

- Make sure the land anchors chosen will withstand the forces that could be applied to them.
- If you are unsure about the fitting of the ground anchors then this process should be carried out by a trained engineer
- Ensure the ground anchors are located/spaced precisely, see Fig 3

Fig 3

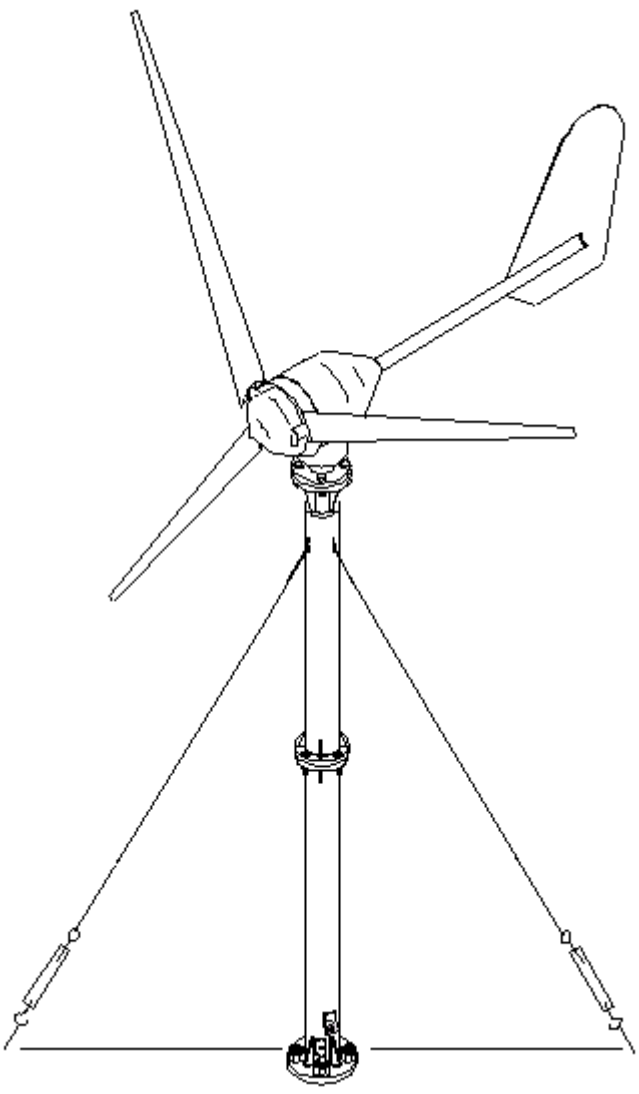


ERECTING THE TOWER

Note: Do not attempt to lift the tower and turbine on your own.

1. Ground anchors should be fitted directly opposite each other (see Fig 4)
2. Fit the guy cables to the tower using the U brackets provided
3. Lift the tower into position
4. Connect the cables to the ground anchors
5. Tighten the cable tightening devices so the tower is supported straight, a spirit level should be used for this

Fig 4

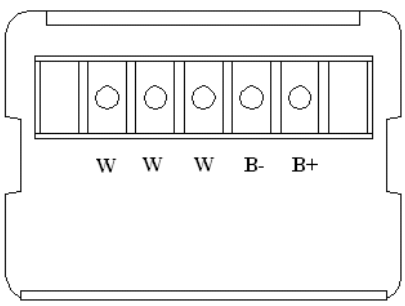


CONTROLLER SPECIFICATIONS

Model	BWTCONTRM	BWTCONTRS
Voltage (v)	12	12
Wind Generator Power (w)	500	100~400
Turbine Rated Current (a)	25	25
Max Current Output (a)	40	30
Function	PWM	MPPT
Working Temperature (℃)	-20~+60	-20~+60
Protection	Over charge, over discharge, reverse connection of batteries, overloading, current control, automatic braking or manual braking of wind generator	

CONNECTING THE CONTROLLER

- Inputs W, W, W: Connect output from wind turbine, three wires
- Input B +: Connect the positive from the battery
- Input B -: Connect the negative from the battery



The controller should be located in a dry, well-ventilated area and at least 1.5 meters away from the battery(s)

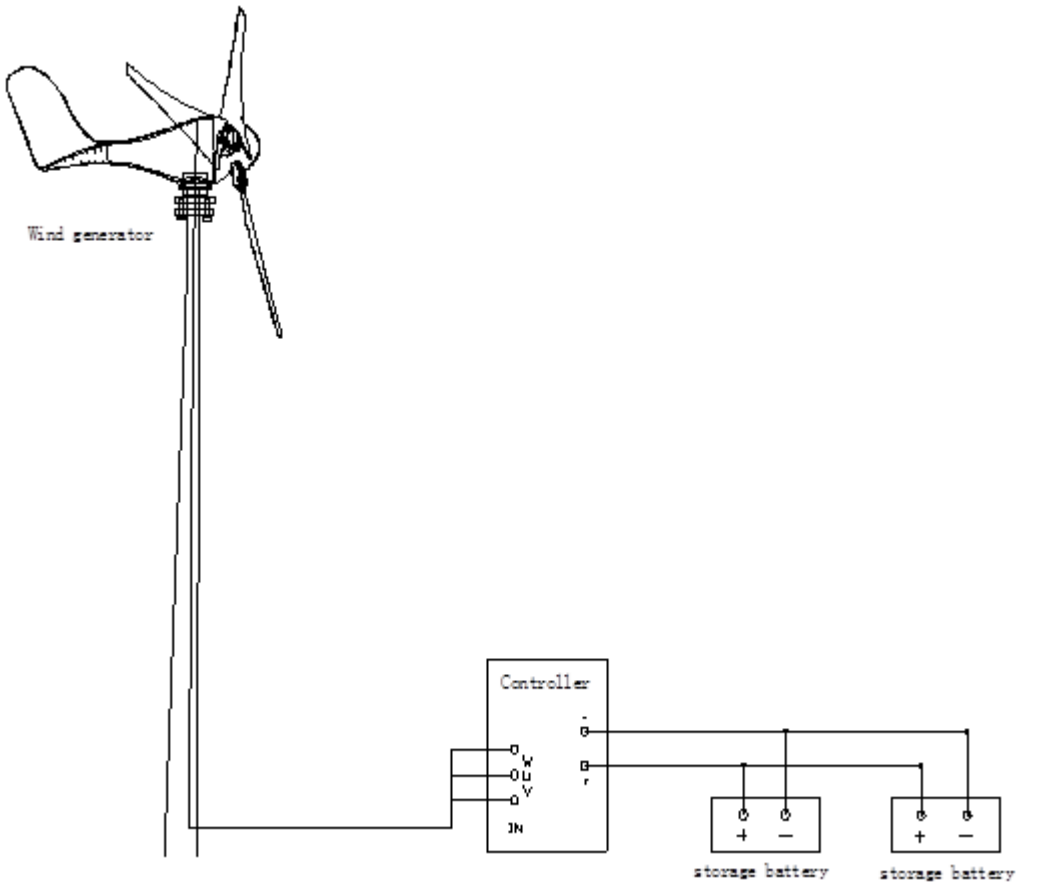
BATTERY LOCATION

The battery(s) and controller should be located as close to the wind turbine as possible, this will reduce cost and efficiency. Placing the battery(s) close to the turbine will mean:

- Less voltage drop, better efficiency at full power
- Smaller gauge cable can be used
- Reduced loss of power in the wires
- Less cable will be required

When planning a wind turbine installation all the above considerations should be taken into consideration.

WIRING DIAGRAM



The Biard wind turbine can be wired to a single battery or a battery bank wired in parallel as above to keep the voltage at 12V.
The biard turbine is compatible with the below battery types:

- Sealed Lead Acid
- Gel battery ("gel cell")
- Absorbed glass mat (AGM) battery

Although the Biard wind turbine will charge most size battery(s) please refer to the below table 2 for ideal size's.

Table 2

Turbine	Ideal Battery Size	Battery Voltage
BWT300S	100AH -200AH	12V
BWT400S	100AH -200AH	12V
BWT500M	200AH~400AH	12V

MAINTANANCE

Although Biard wind turbines are designed to work in poor and extreme weather conditions regular checks should still be carried out on the turbine and turbine structure. Special examination of the turbine should be carried out after heavy storms.

General maintenance checks should incorporate the below checks:

- Check all support structures for wear and tear, checking the base for signs of movement and the guy cables for wear tightness.
- Check the blades for signs of fractures, although the blades on the Biard turbines are very strong they could be broken or fractured if they come into contact with a solid object.
- Check electrical system of the turbine for signs of wear

TROUBLESHOOTING

If you are experiencing problems with any of the components within this kit then please call our customer services helpline.

Note: There is a short break-in period with new wind turbines. The bearings in both the turbine yaw and the turbine rotor will require approximately 60-100 hours of operation in normal wind speeds (approximately1820mph, 8 –9 m/s) before they are running at peak efficiency. During this break-in period, the turbine operation might appear sluggish.

WARRANTY

2 Year